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ABSTRACT

This paper presents a review of relevant literature on treatment approaches for the modification of smoking behavior, followed by an outline of an approach developed by the author to decrease his own rate of cigarette smoking. Studies are reviewed which have used various treatment methods: use of electric shock, satiation and/or use of cigarette smoke as an aversive technique, covert sensitization procedures, and other approaches which combined these techniques. The treatment approach described in the author's own case study is a multi-faceted, combined-technique approach to smoking reduction. An outline of this case study includes descriptions of the subject; treatment goal; intervention strategy; and recording procedure for baseline, intervention and follow-up data. Data from the self-monitoring, self-modification project are presented, along with a discussion of its effectiveness and the strengths and weaknesses inherent in the multi-faceted approach. (NRB)

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SELF-MONITORING APPROACH FOR THE MODIFICATION OF SMOKING BEHAVIOR: A CASE STUDY

1981

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A Self - Monitoring Approach For The Modification

Of Smoking Behavior

The purpose of this paper is threefold: 1) to offer a review of the relevant literature on treatment approaches for the modification of smoking behavior; 2) to outline an approach developed by this researcher, which was undertaken to decrease his own rate of cigarette smoking; and 3) to present the data from a self-monitoring/ -modification project which was conducted in March and April of 1979, along with a discussion of its effectiveness and the pros and cons inherent to the multi-faceted approach.

Review of the Literature

Smoking has been declared injurious to one's health by the Surgeon General, and consumers are so warned on the packages and in magazine advertisements of the potential risks entailed. During the last 15 years,there has been a concerted effort on the part of the Surgeon General's Office, the American Cancer Society, the American Heart Association and numerous private organizations aimed at reducing the incidence of smoking among adults and discouraging the development of the habit among young people. Given the widespread incidence of smoking behavior, the apparent health hazard, and the easy quantification of the target behavior at hand, a number of treatment approaches have been devised as means of reducing or eliminating smoking behaviors of individuals. As evidenced by the number of smoking modification studies in the literature of psychology and medicine, researchers have shown considerable interest in developing and implementing such techniques to aid smokers in their attempts to kick the habit.

The present paper will review a number of studies which represent some of the more prevalent approaches to the modification of smoking behavior. In an attempt to include the most relevant and worthwhile approaches of the many employed to date, the studies reviewed are grouped according to the treatment method of interest

in each study - including the use of electric shock as an aversive stimulus, satiation and/or the use of cigarette smoke as an aversive technique, covert sensitization procedures, and other approaches which make use of various combined techniques.

Use of Electric Shock

Russell, Armstrong and Patel (1976) divided a test group of 70 subjects into five treatment conditions: non-contingent electric shock, electric shock contingent with cigarette smoking, a no-shock condition, a "supportive interchange" session condition, and a no-treatment condition. Subjects in the no-shock condition smoked during sessions according to the schedule used in the two electric shock groups, the supportive session group exchanged suggestions and mutual encouragers for abstaining, and the no-treatment control subjects were simply told to abstain by any method of their own choosing. After a two-week experimental period, the two electric shock groups were reported as having the lowest percentages of members abstaining (43%), though all four treatments were found to be more effective than the no-treatment control condition.

Conway (1977) assigned smokers to groups recieving no shock conditioning, a placebo shock (subthreshold), shock delivered by the therapist, shock delivered by the subject, and a type of covert sensitization using actual smoking behaviors. In each of these five conditions, half of the subjects recieved a self-management program while half recieved no such program. Although none of these treatment combinations led to significant reductions in smoking, consumption rates were significantly reduced with the self-management techniques in the covert sensitization, subject-delivered and therapist-delivered shock groups.

These studies and others seem to support the contentions put forth in earlier reviews of shock conditioning and smoking behaviors (see Lichtenstein and Keutzer, 1971) - that laboratory-administered electric shock is a generally ineffective means of modifying smoking behavior. However, variants of the contingent-shock

techniques, such as those used at the Schick Centers where they are combined with other modification techniques, may be somewhat more effective in reducing and eliminating smoking behaviors.

Satiation and/or Use of Cigarette Smoke as an Aversive Stimulus

Several earlier studies on modification of smoking behaviors involved satiation procedures which liken aversive control techniques (see Wilde, 1964; Franks, Fried and Ashem, 1966). In the satiation approach, subjects increase their consumption of cigarettes during a 2- to 6-week period in hopes that the excessive smoking will cease to be rewarding by becoming aversive. Another satiation technique of sorts, rapid smoking, has also been utilized - requiring subjects to inhale their tobacco at an increased rate (usually one puff every 6 seconds) until they can no longer smoke, and to repeat this process several times during each treatment session. Although these aversive - type approaches are held as comparable to other treatment techniques in reducing or eliminating smoking behaviors, both may be physically dangerous for some subjects, and a medical screening of subjects is necessary whenever these techniques are used. Horan, Linberg and Hackett (1977) have noted the similarities between nicotine poisoning and the effects of rapid smoking, the most serious of which are cardiac arrhythmias.

Lando (1975) compared rapid smoking with an excessive smoking approach (in which subjects consumed cigarettes at about twice their normal rate) and with a normal smoking (unaltered rate) control group. At the two-month follow-up, the percentage of subjects abstaining was 36% for the rapid smoking group, 46% for the satiation group, and 24% for the normal-smoking control group. In a subsequent study by Lando (1976) in which rapid smoking, normal smoking and self-paced satiation groups were compared, the rapid smoking group reported a 59% reduction in smoking as compared to 45% reductions for both the normal smoking and self-paced

satiation groups upon the 6-month follow-up. Apparently, satiation by rapid or excessive smoking does produce effects with some subjects, depending upon the experimental conditions imposed and the availability of additional aids in the process of smoking modification (Lando, 1976).

Another oft-used aversive technique involves the use of stale cigarette smoke or smoky air blown into the subject's face in the course of treatment. The aversive nature of the smoke is usually cited for any success achieved using this procedure. Lichtenstein, Harris, Birchler, Wahl and Schmahl (1973) assigned subjects to one of four treatment conditions: smoky air with rapid smoking, smoky air only, rapid smoking only, or an attention-placebo control. Following the formal treatment sessions, all subjects were contacted during the follow-up period and encouraged to come in for "booster treatments" as needed. It was found that 90% of the subjects who had been in the smoky air with rapid smoking condition were abstaining at the time of termination of the treatment, but that all subjects in the other groups had ceased smoking entirely. However, at the time of the six-month follow contact, it was discovered that only 30% of the attention-placebo subjects were abstinent as compared to 60% in each of the other three groups.

Schmahl, Lichtenstein, and Harris (1972) conducted sessions in which smokers were required to smoke rapidly while recieving either smoky air or mentholated air. In this study, half of each group was contacted every two weeks throughout the follow-up period while the other half was contacted every four weeks, and if subjects reported a relapse during these contacts a booster session was recommended. Surprisingly, rapid smoking proved to be more effective when combined with mentholated air than when combined with smoky air, and low-contact subjects smoked less than high-contact subjects at the time of a six-month follow-up.

Covert Sensitization

In the covert sensitization approach (see Cautela, 1970), the therapist typically (a) induces the subject into imagining that he is preparing to smoke, lighting the cigarette and inhaling, while (b) simultaneously imagining that he feels nauseous and subsequently vomits when he inhales. This technique is certainly less threatening to the subject's safety, as it is entirely imaginal and thus poses less physical danger.

Irey (1972) alternated sensitization (nausea) and avoidance (relief) scenes throughout a series of ten treatment sessions, and reported significant reductions of smoking behaviors upon a four-month follow-up. Sachs, Bean and Morrow (1970) found that subjects in a covert sensitization group reported a higher percentage of abstinence (63%) at a one-month follow-up than did self-control and no-treatment control groups. However, Sipich, Russell and Tobias (1976) found no significant differences in the reduction of smoking (at the time of termination of treatment) between a covert sensitization treatment group and four control groups: a waiting list only control, a self-control only control, a no-contact (pre- and post-treatment data only) control, and an equally credible placebo ("subliminal messages" on a tachistoscope) control group.

Findings reported in the literature to date suggest that the covert sensitization technique has proved to be of only limited value as a general treatment approach - although it may indeed be of value in treating certain, select individuals.

Combined - Technique Approaches

Use of group training sessions and/or the "buddy system", often in conjunction with one of the above techniques, have been shown to produce impressive results in the reduction or elimination of smoking behaviors. Two studies which utilized

training sessions in conjunction with other techniques reported significant decreases in treatment subjects' smoking behaviors. Flaxman (1976) had subjects attend four training sessions over a two-week period prior to quitting completely, while Lando (1977) offered subjects six sessions in a one-week period prior to quitting. Flaxman's subjects recieved training which was oriented toward helping the smokers to establish new habits to replace smoking - by first learning to identify and alter (i.e., initiate change and control over -) the stimulus events which served as cues to smoking behaviors, and to then develop skills in the use of deep muscle relaxation and thought-stopping techniques to aid in the elimination of smoking behaviors. Lando's subjects underwent aversive (rapid smoking) conditioning and were provided with audiotapes and lectures on how to "unlearn" the smoking habit. Both approaches were cited as contributing to the success of the treatments as evidenced by drastic reductions of subjects' smoking behaviors.

Janis and Hoffman (1970) had partners with similar "quit smoking" goals meet once each week for five weeks to discuss problems in abstinence, offer suggestions to one another, and provide mutual encouragment and support. Persons in a high-contact group kept the same partner throughout the five-week period, and were asked to telephone each other on a daily basis; low-contact subjects also maintained the same partner, but had no contact between formal discussion sessions, while control subjects had a different partner at each meeting. Subjects in the high-contact group reported a 90% reduction reduction of smoking at termination of the formal sessions, and a 74% reduction when contacted six weeks later.

Levenberg and Wagner (1976) compared a systematic desensitization technique against a rapid smoking approach. The systematic desensitization group was trained in the use of relaxation techniques and then presented with a hierarchy which consisted of visual images of increasingly longer cigarette deprivation. Low rates of success were reported for both treatment groups (28% and 26%, respectively) as

well as a "relaxation only" control group (21%), and the authors concluded that the treatment techniques were about equally ineffective as carried out in this study.

Other studies by Upper and Meredith (1970) and Shapiro, Tursky, Schwartz and Shnidman (1971) have utilized techniques designed to decrease smoking by gradually lengthening the intervals between consumption in a systematic, cue-controlled manner. Using a portable apparatus which emits an auditory signal, the device is initially set to go off at times consistent with the subject's normal rate of smoking - the intervals between these "cues" are then gradually increased until the rate of consumption is reduced to the desired level or eliminated completely. Both groups of researchers reported reductions of up to 55% from normal rates of smoking upon six-week follow-up contacts.

It seems that most single-treatment techniques have proven to be somewhat less than successful when compared with the combined-technique approaches. It should be recognized, however, that the general population of smokers may not be sampled adequately by these studies, as those who actively seek treatment are often advised to do so for medical reasons. According to some recent research studies (Flaxman, 1976; Lando, 1977), total abstinence is recommended as the decidedly superior approach to elimination of smoking behaviors, while the so-called "gradual approach" is hailed by others (Greenberg and Altman, 1976) as the more effective means of reduction or elimination of smoking behaviors. Surely, different strategies are needed for different people, since each individual's motivation toward reduction or elimination of smoking behaviors may be viewed as unique. With this in mind, we proceed to the detailing of a multi-faceted, combined-technique approach to smoking reduction which was developed by this researcher in March, 1979.

Treatment Approach

A case description, and the strategy employed for the reduction of smoking behaviors, are outlined below:

Subject. A 26-year old Caucasian male, who has been smoking cigarettes for approximately eight years; physical health is otherwise excellent. Currently completing the course and practicum requirements for a master's degree in counseling psychology at North Texas State University in Denton, he noted that his rate of cigarette smoking has steadily increased from approximately 15 per day to a rate of "about two packs a day" since entering graduate school on a full-time basis in 1978. In December of 1978, he first indicated an interest in reducing his daily cigarette consumption through initiation of a structured modification technique(s).

Treatment Goal. 50% reduction from baseline of average daily rate of cigarette consumption.

Intervention Strategy. Multi-faceted, primarily involving (A.) reduction of the rate of cigarette smoking through a fixed-interval administration of positive reinforcement (reward). Additional measures (B.) were taken in order to (1.) reduce the number of smoking-related cues and the ease of obtaining cigarettes in his usual home and work environs, and (2.) to develop substitute activities which serve to offset the anxiety associated with the withdrawal process:

A. Positive reinforcement - consisted of depositing money saved from decreased purchases of tobacco (4¢ per cigarette) into a glass jar, on a daily basis. The amount of money saved after seven days is then used to reward the subject by allowing him to purchase a meal at his favorite restaurant, a luxury which he would not otherwise be able to afford.

B. Additional measures taken -
   1. Smoking-related cues
      - removing ashtrays from work and study settings;
      -walking, instead of driving, to a local store for purchasing of each individual pack of cigarettes; ceasing to purchase cigarettes in the ten-package cartons;
      -identifying the various situations in the school setting which seem

to be related to cigarette consumption, by way of rank-ordering settings and situations from "most likely to cue smoking behavior" to least likely to cue smoking behavior"; periodically reviewing this list and maintaining awareness of these (after Sachs et. al., 1970);
-designating a "smoking chair" in the home setting, where all cigarettes consumed there must be smoked, for the duration of the 15-day intervention period (after Nolan, 1968);
-storing cigarettes in the rear of his briefcase when at school; keeping cigarettes in a drawer of his desk while at home.

2. Substitute behaviors
-working in the yard and/or completing a furniture refinishing project in the garage behind his home;
-gum-chewing, when the urge to smoke arises within any one-hour period following his last cigarette;
-maintaining a schedule of reporting daily to a "reduce-smoking" partner (after Janis and Hoffman, 1970).

Recording Procedure. Data was recorded in terms of frquency/rate per day (number of cigarettes smoked), on a continuous basis; baseline measurements were taken for a period of ten days, at which time the above mentioned intervention strategies were initiated for fifteen days. Data was also recorded during a 7-day follow-up period, during which no intervention (reinforcement, cue-reduction or substitute activities) techniques were maintained.

Results

	Day #	Date	Number smoked
I. Baseline:			
	1	Sun., March 4th	54
	2	Mon., " 5th	51
	3	Tues., " 6th	47
	4	Wed., " 7th	56
	5	Thur., " 8th	49
	6	Fri., " 9th	50
	7	Sat., " 10th	51
	8	Sun., " 11th	52
	9	Mon., " 12th	49
	10	Tues., " 13th	57

The average daily rate of consumption was 51.6 cigarettes per day, or about 364 during every seven-day period - well beyond his estimated average of "(about) two packs a day".

Insert Figure 1 about here

II. Intervention:

Day #	Date	Number Smoked	Money** Saved
1	Wed., March 14th	31	$ .84
2	Thur., " 15th	28	.96
3	Fri., " 16th	24	1.12
4	Sat., " 17th	25	1.08
5	Sun., " 18th	22	1.20
6	Mon., " 19th	24	1.12
7	Tues., " 20th	20	1.28
8	Wed., " 21st	31	.84
9	Thur., " 22nd	30	.88
10	Fri., " 23rd	26	1.04
11	Sat., " 24th	28	.96
12	Sun., " 25th	24	1.12
13	Mon., " 26th	24	1.12
14	Tues., " 27th	24	1.12
15	Wed., " 28th	32	.80

** Note: computed by Baseline - Number Smoked x $.04

The intervention techniques taken together were tentatively evaluated as being successful. The average number of cigarettes smoked per day was reduced from about 52 (51.6 at baseline) to just slightly greater than half of that figure (26.2 cigarettes per day average consumption during the 15-day Intervention period). On Tuesday night, March 20th, and again on Tuesday night, March 27th, our subject enjoyed a meal in his favorite restaurant (Caro's on Bluebonnet Circle in Fort Worth) as he recieved $7.60 and $7.08 on those respective occasions.

Insert Figure 2 about here

III. Follow - Up:

Day #	Date	Number Smoked
1	Thur., March 29th	27
2	Fri., " 30th	28
3	Sat., " 31st	30
4	Sun., April 1st	30
5	Mon., " 2nd	29
6	Tue., " 3rd	26
7	Wed., " 4th	28

Average daily consumption increased slightly during the 7 - day follow-up period, upward to 28.3 cigarettes per day.

Insert Figure 3 about here

The significant reduction of this subject's daily consumption rate upon initiation of the intervention techniques, and the slight rise upward upon termination of such measures, is more clearly illustrated in Figure 4.

Insert Figure 4 about here

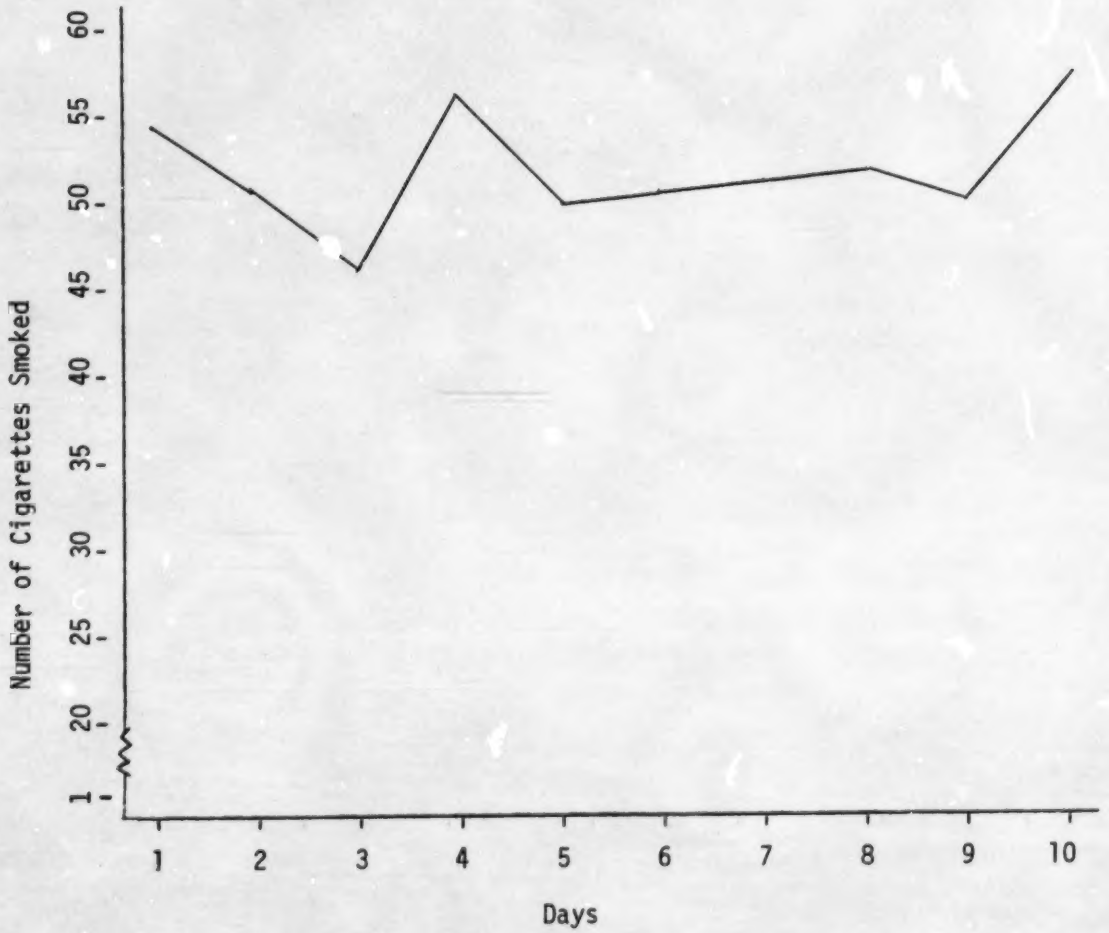
Discussion

This multi-faceted intervention approach for the reduction of smoking behaviors proved to be successful - as indicated by the data, a significant (though slightly short of the Treatment Goal) reduction in the daily rate of consumption was achieved.

Table 2 reveals that an increase in the daily rate occurred during the days immediately following the administration of the reward (meal), and that daily consumption seemed to taper off as such "target"dates grew nearer. This perhaps reflects the power of the positive reinforcement strategy employed in this modification procedure. Perhaps a continuous reinforcement schedule of some type might be initiated during the first five days of the Intervention period, followed by delivery of reinforcement on an intermittent schedule, in an effort to maintain consistently lower rates of smoking. A time-sampling method of data recording might also prove to be valuable in this type of modification procedure, as it is believed that much of the smoking behaviors occur in response to specific cues in the school setting which were left unidentified on the subject's hierarchy of "most likely . . ." to"least likely to cue smoking behaviors". In addition to the above recommendations, this researcher suggests that a time-based schedule for smoking be devised, with increasingly longer intervals between consumption times planned out for the duration of the Intervention period. Such a cue-controlled or otherwise regulated schedule might be readily implemented in conjunction with this multi-faceted intervention approach, which has proved beneficial in reducing one indi-

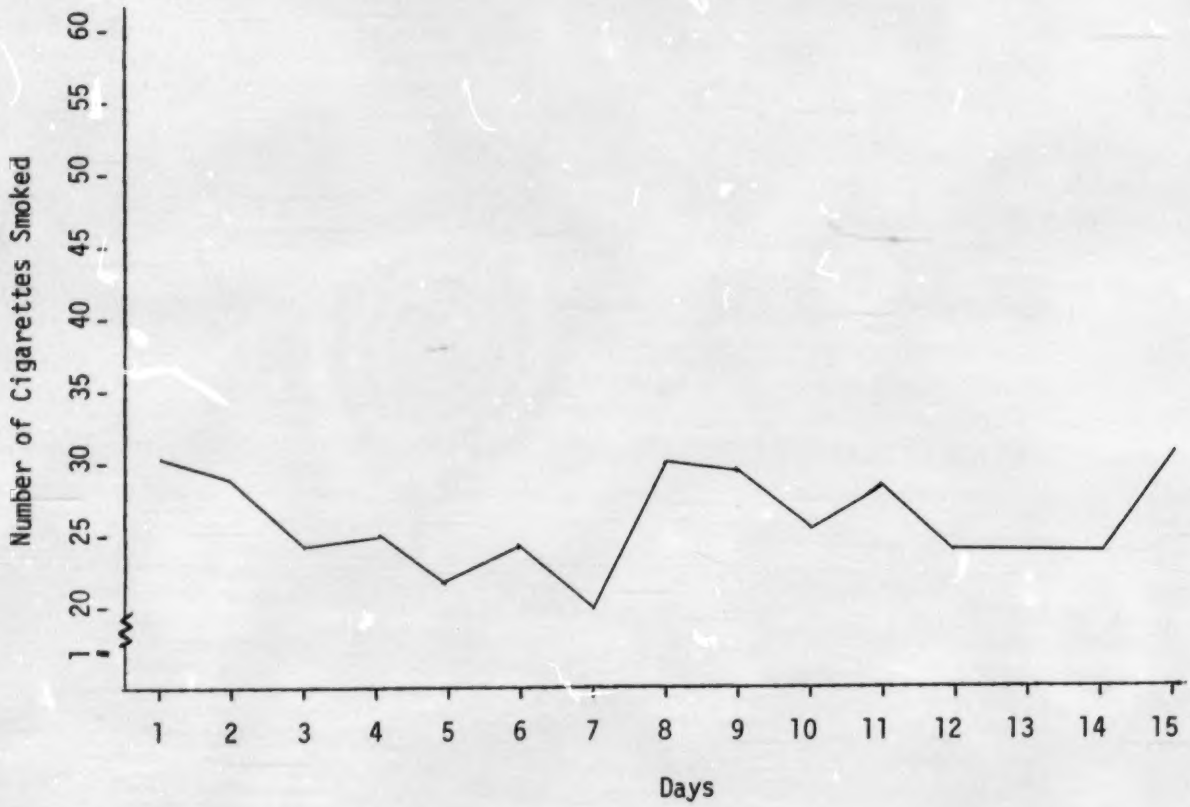
vidual's cigarette smoking behaviors.

Figure 1



BASELINE PERIOD
March 4 - 13

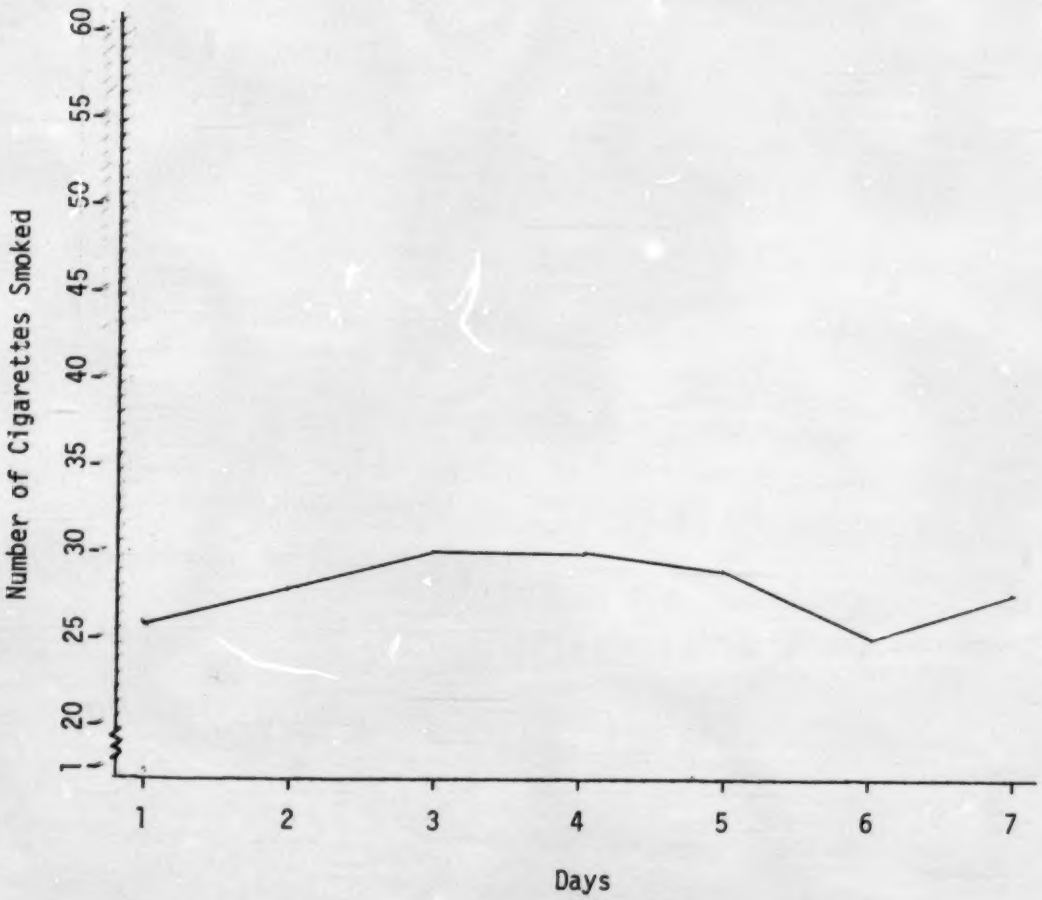
Figure 2



INTERVENTION PERIOD

March 14 - 28

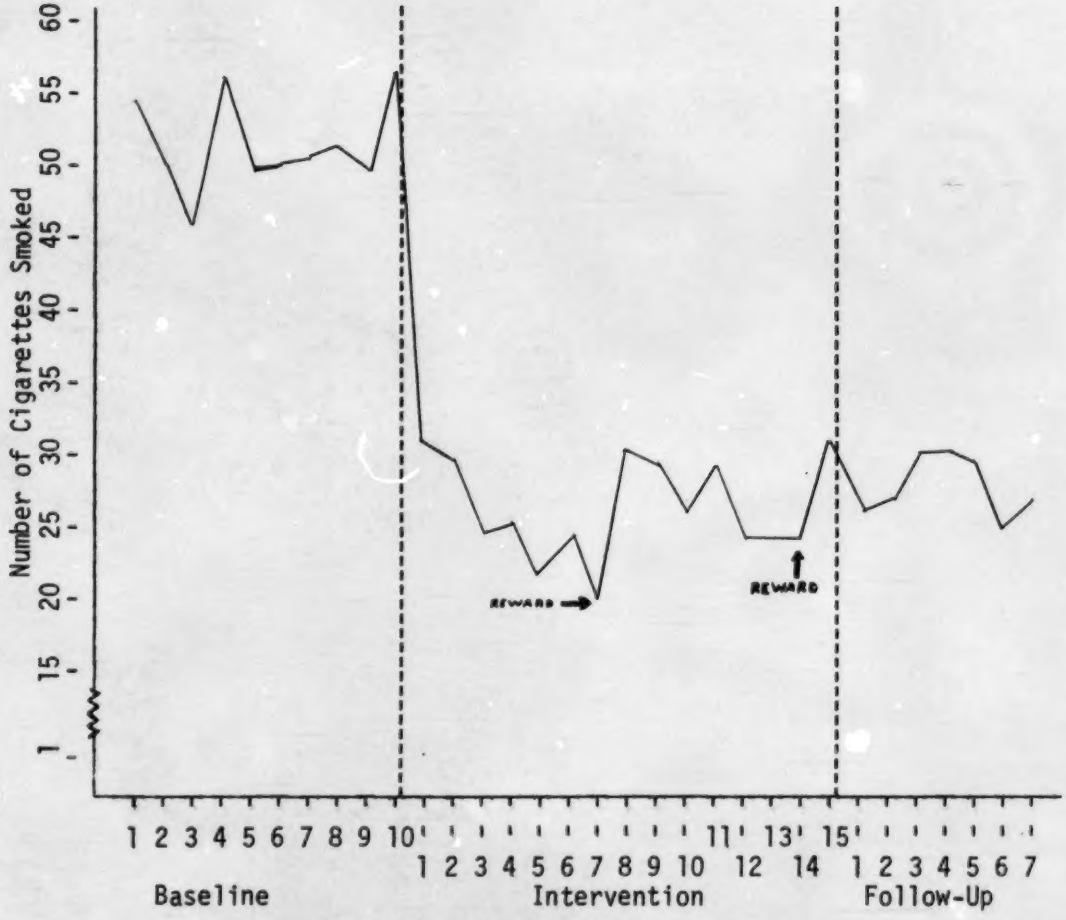
Figure 3



FOLLOW-UP PERIOD

March 29 - April 4th

Figure 4



ENTIRE SELF - MONITORING / MODIFICATION / FOLLOW-UP PERIOD

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